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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/584,882

06/29/2006

Fariba Hatami

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WASHINGTON, DC 20005

EXAMINER

KIM, JAY C

ART UNIT

PAPER NUMBER

2815

NOTIFICATION DATE

DELIVERY MODE

03/20/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-PAT-Email@rfem.com

Office Action Summary	Application No. 10/584,882	Applicant(s) HATAMI ET AL.	
	Examiner JAY C. KIM	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 8, 10 and 15-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9 and 11-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/29/06, 8/8/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the Application filed June 29, 2006.

Election/Restrictions

1. Applicants' election without traverse of Group I and Species II in the reply filed on December 24, 2008 is acknowledged. Claims 15-17 are withdrawn from further consideration as being drawn to a nonelected invention, and claims 8 and 10 are withdrawn from further consideration as being drawn to a nonelected Species, because the limitation "an adjusting device for adjusting the pulse rate" recited in claim 8 is disclosed on lines 31-33 of page 13 of current Application referring to Fig. 6 drawn to Species III.

Claim Objections

2. Claims 1-6 and 9 are objected to because of the following informalities:

In claims 1-6 and 9, numerals and alphabet letters in parentheses referring to the corresponding elements in the Specification and Drawings should be removed.

In claim 1, "a second semiconductor type" should be replaced by "a second conductivity type" on line 6, "the current" should be replaced by "a current" on line 13.

In claim 6, on line 4, "include Al_xGa_{1-x}P" should be replaced by "includes Al_xGa_{1-x}P", and on line 5, "III-V" should be replaced by "III-V".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4-7 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 4, it is not clear what a "lateral extent of the quantum structures" refers to, because "quantum dots" and "a quantum well" are configurations of the quantum structures. In the below prior art rejection, it is interpreted that the "lateral extent of the quantum structures" refers to a lateral extent of the quantum dots.

Regarding claim 5, it is not clear what "the semiconductor regions" refer to, because "a first semiconductor region", "a second semiconductor region", and "an active semiconductor region" are recited in claim 1. In the below prior art rejections, it is interpreted that "the semiconductor regions" refer to any plurality of semiconductor regions.

Regarding claim 6, it is not clear whether "the first semiconductor region", "the second semiconductor region" and "the active semiconductor region" each has the same x for $\text{Al}_x\text{Ga}_{1-x}\text{P}$ or may have a different x . Claim 7 depends on claim 6, and therefore claim 7 is also indefinite.

Claim 9 recites the limitation "the pulse duration" on line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 5, 9 and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Okuyama et al. (US 2002/0145148).

Regarding claims 1 and 9, Okuyama et al. disclose a semiconductor device (Fig. 12) for emitting light when a voltage is applied comprising a first semiconductor region (159) (line 10 of [0116]) whose conductivity is based on charge carriers (electrons) of a first conductivity type (n-type), a second semiconductor region (158) (lines 11-12 of [0116]) whose conductivity is based on charge carriers (holes) of a second conductivity type (p-type), which have a charge opposite to the charge carriers of the first conductivity type, and an active semiconductor region (160) (line 11 of [0116]) which is arranged between the first semiconductor region (159) and the second semiconductor region (158), in which quantum structures (two sides of triangular structures) of a semiconductor material (InGaN) with a direct band gap are embedded in at least two different configurations (two sides of triangular structures) which are coupled to each other, and an associated switching device (170) (lines 1-5 of [0117]) for influencing a current flowing through the active semiconductor region (160) (claim 1), wherein the switching device (170) inherently includes an adjusting device (claim 9).

Further regarding claims 1 and 9, the claim limitations “which is so designed as to switch to and fro at least between a current flow through the active semiconductor region with a current intensity below a given threshold current intensity and a current flow through the active semiconductor region with a current intensity above the

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threshold current intensity” and “for adjusting the pulse duration” specify an intended use or field of use, and are treated as non-limiting since it has been held that in device claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex Parte Masham*, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987).

Regarding claim 5, Okuyama et al. further disclose that semiconductor regions (composite layer of 159, 160 and 158) are embodied in the form of semiconductor layers of a layer stack.

Regarding claim 11, Okuyama et al. disclose a semiconductor device (Fig. 12) as set forth in claim 1 characterised by being in the form of a light emitting diode (lines 1-3 of [0116]).

Regarding claim 12, Okuyama et al. disclose a display device having an array-like arrangement of semiconductor devices as set forth in claim 1 ([0006] and [0120]).

Regarding claims 13 and 14, Okuyama et al. further disclose that the switching device (170) is adapted to output for each semiconductor device its own switching signal (claim 13), and that each semiconductor device has its own switching device

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associated therewith (claim 14), which are inherent to emit light with a different wavelength and also to be used as a pixel of a display device.

7. Claims 1, 2, 5, 9 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Shields et al. (US 2003/0127608).

Regarding claims 1 and 9, Shields et al. disclose a semiconductor device (Figs. 2 and 6) for emitting light when a voltage is applied comprising a first semiconductor region (23) (lines 4-7 of [0148]) whose conductivity is based on charge carriers (holes) of a first conductivity type (p-type), a second semiconductor region (31) ([0152]) whose conductivity is based on charge carriers (electrons) of a second conductivity type (n-type), which have a charge opposite to the charge carriers of the first conductivity type, and an active semiconductor region (composite layer of 25, 27 and 29) (lines 7-8 of [0148], lines 4-6 of [0149], and lines 1-2 of [0151]) which is arranged between the first semiconductor region (23) and the second semiconductor region (31), in which quantum structures (27) of a semiconductor material (InAs) with a direct band gap are embedded in at least two different configurations which are coupled to each other, which is inherent when InAs quantum dots are formed by Stranski-Krastanov mechanism (lines 6-8 of [0149]), and an associated switching device for influencing a current flowing through the active semiconductor region (composite layer of 25, 27 and 29), which is inherent to apply a voltage as shown in Fig. 6 (claim 1), wherein the switching device inherently includes an adjusting device (claim 9).

Further regarding claims 1 and 9, the claim limitations “which is so designed as to switch to and fro at least between a current flow through the active semiconductor

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region with a current intensity below a given threshold current intensity and a current flow through the active semiconductor region with a current intensity above the threshold current intensity” and “for adjusting the pulse duration” specify an intended use or field of use, and are treated as non-limiting since it has been held that in device claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex Parte Masham*, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987).

Regarding claim 2, Shields et al. further disclose that InAs quantum dots are present as a configuration of the quantum structures (27) and a quantum well layer is present as a second configuration of the quantum structures (27), which is inherent when InAs quantum dots are formed by Stranski-Krastanov mechanism (lines 6-8 of [0149]).

Regarding claim 5, Shields et al. further disclose for the semiconductor device as set forth in claim 1 that semiconductor regions (23, 31 and composite layer of 25, 27 and 29) are embodied in the form of semiconductor layers of a layer stack.

Regarding claim 11, Shields et al. disclose a semiconductor device as set forth in claim 1 characterised by being in the form of a light emitting diode (Fig. 2).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shields et al. (US 2003/0127608). The teachings of Shields et al. are discussed above.

Regarding claims 3 and 4, Shields et al. differ from the claimed invention by not showing that the quantum dots are of a lateral extent which on average is less than about 50 nm (claim 3), wherein the average lateral extent of the quantum dots is in the range of between 10 and 30 nm (claim 4).

The claims are prima facie obvious without showing that the claimed ranges of a lateral extent achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In*

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re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAY C. KIM whose telephone number is (571)270-1620. The examiner can normally be reached on 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. K./

Examiner, Art Unit 2815

March 14, 2009

/Kenneth A Parker/

Supervisory Patent Examiner, Art Unit 2815